had shown, by the study of the fossils of the enormous deposits of chalk in his own country, that not only must the deposition of this thick formation have occupied vast periods of time, but that the changes taking place in the fauna during those periods furnish us with evidence by means of which the almost homogeneous mass of strata could be divided into a number of clearly recognisable "palæontological zones." Hébert's distinguished pupil, Prof. Charles Barrois, of Lille, by a general *reconnaissance* over the chalk areas in the British Isles, proved that these zones could be traced through the length and breadth of our land. Jukes-Browne took up the task of working out the details of this classification of the English chalk strata, and after traversing during nine years the Cretaceous areas of the south and west of England published his results in three volumes of the Survey Memoirs.

In the winter of 1888–9 the state of his health caused Jukes-Browne to go to Barbadoes; there he worked at his favourite studies with such good purpose as to be able to publish, in conjunction with Prof. J. B. Harrison, a most valuable description of the upraised oceanic deposits in that island.

Besides his survey memoirs, and many papers in scientific journals, Jukes-Browne wrote three geological text-books and a work of more general and speculative character, "The Building of the British Isles," and some of his books have passed through several editions. The value of his scientific labours was recognised by the award of the Murchison medal by the Geological Society and by his election to the Royal Society. In 1902 the state of his health compelled his retirement from the Geological Survey, and the last twelve years of his life were passed at Torquay, where he died on August 14. J. W. J.

NOTES.

A Central News message from Melbourne on Tuesday, August 25, states that a number of members of the British Association attending the Australian meeting are curtailing their proposed tour and preparing for a speedy departure for England. Exactly what this message signifies is, however, not quite clear. The Sydney session did not begin until August 20, and the intention was to proceed to Brisbane afterwards, but the whole meeting was not to last more than about three weeks from August 8.

It is reported in the *Times* that an oil well has been discovered at Muir of Ord, about ten miles' distance from Inverness, and that tests are being applied to discover the nature of the oil and its commercial value, if any.

The outbreak of war has, of course, made it impossible for drugs to be obtained from Germany as has hitherto been the case. In this connection the Government has appointed a committee to consider questions in relation to the supply of drugs in the United Kingdom. The members of the committee are: Dr. J. Smith Whitaker, Sir Thomas Barlow, Sir Lauder Brunton, Dr. A. Cox, Prof. A. R. Cushny, Dr. E. Rowland Fothergill, Dr. B. A. Richmond, Dr. F. J. Smith, Dr. W. Hale White, with Dr. E. W. Adams as secretary.

The Government of Madras recently undertook an investigation into the causation, prevention, and possible cure of diabetes, and secured the services of Dr. S. W. Patterson as investigator. We learn from the Allahabad *Pioneer Mail* that the sum of 50,000 rupees has been given by the Raja of Pithapuram for the purpose of carrying out the project, and that the Surgeon-General with the Government of Madras has been requested to submit to the Government by an early date proposals for providing Dr. Patterson with the necessary staff and laboratory accommodation.

The twenty-fifth annual general meeting of the Institution of Mining Engineers will be held at Stoke-on-Trent on September 9, under the presidency of Sir W. E. Garforth, when the following papers will be read, or taken as read:—The absorption of oxygen by coal: part ii., the quantity of oxygen absorbed; part iii., the thermal value of the absorption; part iv., the influence of temperature; part vi., the ratio of spontaneous heating of coal, T. F. Winmill; the absorption of oxygen by coal, part v., the influence of temperature on the rates of absorption of different parts of the Barnsley Bed, J. I. Graham; self-contained rescue-apparatus and smoke-helmets for use in irrespirable atmospheres, Dr. J. S. Haldane; the unknown clays in coal-mines, Dr. J. W. Mellor.

In the June number of *Folk-lore* Mr. J. H. Powell discusses the rite of hook-swinging in India. He describes, with numerous good photographs, the ceremony which he witnessed in the Manbhum district of Chota Nagpur in 1912; and he has collected accounts of the rite from that of Duarte Barbosa in Malabar down to recent times. He compares it with the meriah sacrifice of the Khonds, which Sir J. Frazer explains to be a fertility rite, and he regards it as a survival of human sacrifice. The facts recorded in the article are useful, and the argument is ingenious; but the object of the ceremony still remains obscure. On the analogy of other swinging rites in other parts of the world, it may be suggested that the rotation of the victim is intended to disperse, as a fertility charm, the *mana* of the performer, who by submitting to the rite is believed to be sacrosanct.

The Congress of Archæological Societies, in issuing its report for the past year, directs attention to the passing into law of the Ancient Monuments Consolidation and Amendment Bill, and suggests that societies affiliated to the union, if they have no special earthworks section, should appoint some competent member to watch over the earthworks in their district. It announces with pleasure that steps have been taken to place Worlebury Camp, Somerset, under the protection of the Act, and that steps have been taken to stop the damage that was being done to Bokerly Dyke and some ancient remains near Bristol. But much destruction, as at the Burh of Edward the Elder at Witham, and of Whitehawk Camp near Brighton, still continues, and it is pointed out that the absence of power to compensate owners for loss incurred in the application of the Act is the weak point in the existing legislation on the subject.

MR. R. F. GILDER has issued a catalogue of the remains discovered in the course of a survey conducted by him of a series of prehistoric dwellings in Douglas and Sarpy Counties, Nebraska. There were believed to be depressions caused by bison wallowing in the mud, but are now proved to be of human origin. Along the Missouri river as far as the Platte some forty ruins have been explored, and the specimens collected are now deposited in the Omaha Public Library Museum. The collection consists of numerous articles made of bone and deer horn, pottery, prehistoric pipes, and various ornaments. The most remarkable object is a human head carved out of pink soapstone, which is believed by some competent archæologists to be unique among American collections.

WE have to acknowledge the receipt of a copy of the tenth part of Dr. Koningsberger's *Java,* the greater portion of which is devoted to the fauna of the coast region.

AN extraordinary destruction of gulls and other seabirds at Teesmouth, as the result of a thunderstorm accompanied by the fall of hail and lumps of clear ice, on July 2, is recorded in the August number of *British Birds.* The bodies of three hundred gulls were counted within a distance of three-quarters of a mile, exclusive of those by the side of the breakwater.

FROM the report for the year ending April 30, published in the July number of the *Victorian Naturalist,* we learn that the Victoria Field Naturalists' Club continues in a flourishing condition, although the attendance at the excursions has been diminished owing to the greater demands of military training. Special efforts were made in the matter of bird-protection and the prohibition of the feather-trade.

A SPECIAL double number (August and September) of the *Irish Naturalist* is devoted to an annotated list, by Mr. N. Colgan, of the opisthobranch molluscs to be found on the coast and adjacent shallow water of county Dublin. The Malahide River, or channel, by which the Malahide Creek is alternately filled and emptied, is a classic locality for these organisms, and was the source, in 1844, of specimens described by Alder and Hancock as new species.

Bird-lore for July and August contains a noteworthy letter from Mr. Abbott H. Thayer in regard to the alleged recent diminution in the numbers of the commoner birds in the United States. Impressed with the belief that the replies to question-lists issued to the general public are misleading, the author put himself in communication with Prof. H. Münsterberg, the Harvard psychologist, who unhesitatingly regards the answers as untrustworthy and the result of imagination.

THE Royal Zoological Society of New South Wales has started an illustrated journal of its own—the *Australian Zoologist*—of which the first number was published at Sydney in June. Among its contents is an article by the Rev. T. R. R. Stebbing on a third species of the exclusively Australian genus of caprelline marine crustaceans known as Paraproto. In a second Mr. A. R. McCulloch illustrates the remarkable sexual dimorphism of a pipe-fish, *Stigmatophora nigra,* and likewise describes, under the name of *Histiogamphelus briggsii,* a new generic and specific representative of the same group.

To the series of greatly enlarged models in the Natural History Museum illustrating the structure of insects and other invertebrates harmful to man or domesticated animals have been added several of the bont-tick (*Amblyoma hebraeum*), of southern and central Africa, which transmits heart-water to sheep, goats, and sometimes cattle. With one exception the models are twenty times natural size, and show the male and female under normal conditions, the fully-gorged female (a truly disgusting object), and the larva, the last represented by two models, are multiplied by 20 and the other 120. This interesting exhibit is at present placed in the central hall.

ANOTHER special exhibition in the central hall of the museum includes two cases—originally arranged for the conversazione in connection with the congress of dental surgeons—illustrating some of the most remarkable types of vertebrate dentition, both recent and fossil. The coiled dental spiral of Helicoprion and the button-like teeth of Lepidotus are noticeable in the fish series, while reptiles are represented, among others, by Placodus and Hyperodapedon, and mammals by the marsupial Thylacoleo, Arsinoëtherium, Toxodon, the primitive cetacean Prozeuglodon, and—most interesting of all—the head of a fœtal rorqual from South Georgia with the row of temporary teeth on either side of the upper jaw. Other preparations show the rise and development of the plates of whalebone which eventually cover the entire palate in this and other whalebone-whales.

THE "Report on Scottish Ornithology in 1913, including Migration," by Evelyn V. Baxter and Leonora Jeffrey Rintoul (Oliver and Boyd, Edinburgh; 1*s.* 6*d.* net), is a welcome publication. It summarises in convenient form the ornithological happenings in Scotland during the past year. Following the introductory remarks comes a section on species and subspecies new to Scotland, which is of special interest. The dusky willow-warbler (*Phylloscopus fuscatus*), an Asiatic species not hitherto recorded in any part of Europe, was met with on Auskerry on October 1. New to Scotland during the year, although previously recorded in England, were the lesser grey shrike, the melodious warbler, the Indian stonechat, the gull-billed tern, and the Scandinavian subspecies of the lesser black-backed gull. Scarcely less interesting are many of the records in the longer section on birds new to faunal areas, and uncommon visitors. In the section on extension of breeding range, we note that in 1913 the gadwall, the pintail, and the great crested grebe were all recorded for the first time as breeding species in the faunal area of "Moray." Among the notes in the section "Summer and Nesting" we find several relating to an unexplained scarcity of sea-fowl at various west coast breeding stations. There follow short sections on winter, ringing, plumage, and habits, etc., each of which contains a number of interesting records. A summary is then given of the course of migration during the year, a paragraph being devoted to each month. In the remaining two-thirds of this report of ninety-six pages we find a detailed list of the year's records arranged according to species. There is also an adequate index. The observers are to be congratulated on their effective report, the outstanding feature being the large number of uncommon visitors and the addition of no fewer than five new birds to the Scottish lists.

THE meteorological charts of the North Atlantic Ocean for August issued by the Meteorological Office and other institutions, show that ice conditions have considerably improved since the previous month. Bergs were only met with to any great extent north of 47° N.; the most westerly position in which field ice, with fragments of bergs embedded in it, was seen this year was 42° 18′ N., 62° 43′ W. The first issue (July 16) stated that mist and fog were prevalent at times, and extended up to the Arctic circle. During August, fog over the North Atlantic is in a transition stage; a remarkable feature is said to be its tendency to occur along the parallel of 20° N.

THE renewal of Antarctic exploration and research will bring into prominence the importance of the knowledge of ice conditions in the south polar regions. It is probably well known that the monthly meteorological charts of the Indian Ocean issued by the Meteorological Office usually contain particulars of icebergs of the southern hemisphere, with charts. The issue for September, *e.g.* gives tables of icebergs met with each month during the last twenty-nine years, and also between January and May of this year. The summaries published during past years show that the epochs of frequency are variable, and that bergs may be met anywhere poleward of the parallel of 30° S. Heights of from 800 to 1700 ft. are not uncommon, and in several instances the lengths have been estimated to extend to many miles. It is stated that, unfortunately, angular measurements are seldom recorded.

IN "La Forme de la Terre" (Paris: Hermann et Fils) Dr. Vérronet has written an extremely interesting note on the history of researches into the form of the earth's surface. Pythagoras, Eratosthenes, the forgotten Paris philosophers of the fourteenth century, and Fernel, all played a part in building up our present knowledge. But it is from the work of Cassini that modern geodesy may be said to date. The disagreement that he found between geodetic measures and the results of mathematical reasoning led the Paris Academy to send out an equatorial and a polar expedition to measure meridian arcs so as to settle whether the earth is an oblate or a prolate spheroid. The result then as afterwards more than once was to confirm the conclusions of the mathematicians. Lately a readjustment of geodetic measures has again been made, in terms of such hypotheses as isostasy, to bring the measured value of the earth's ellipticity into accord with the theoretical value deduced from the constant of precession. Despite the attempts at re-adjustment, Dr. Vérronet insists rightly that the ultimate decision must lie with the geodesist, as the value given by the constant of precession depends on the hypothesis that the internal constitution of the earth is essentially fluid. This would appear to be Dr. Vérronet's own view, and by the aid of it he indicates some interesting conclusions as to a belt of earthquake areas in the neighbourhood of latitude 35° (San Francisco, Lisbon, Sicily, Japan). The range of uncertainty is steadily diminishing, and the increased accuracy of the modern work is clearly indicated in the pamphlet. We note one small error—Huyford is spoken of as an English worker. The very brief criticism of Darwin's tidal friction as applied to cosmogony is not at all convincing, and should be either amplified or omitted in any subsequent edition.

A PAPER on the demagnetisation factors of cylindrical rods in high uniform fields, by the late Prof. B. O. Peirce, of Harvard, appears in the June number of the Proceedings of the American Academy. With the help of a large solenoid nearly two metres long, capable of producing a magnetic field of 2500 gauss at its centre, the magnetic flux for high fields through the various sections of rods of different lengths of the same material were measured. It was found that at fields of the order of 2500 gauss the rods need only have lengths about 25 or 30 diameters for the magnetic flux through the central section to be equal, to within a small faction of 1 per cent., to that which would be obtained with a rod of infinite length. If an accuracy of ½ per cent. only is required the rod need only be 15 diameters long. These conclusions have been verified on several specimens of soft iron and mild, tool, and magnet steel. For uniformity of field the magnetising coil should be about 25 of its own diameters longer than the test piece.

ONE of the most interesting cases of the presence of abnormal constituents in the urine occurs in *pentosuria,* when pentoses or five-carbon sugars are found in considerably quantity. Since the work of Neuberg in 1900, the pentose present in such cases has generally been regarded as *dl*-arabinose. Messrs. E. Zerner and R. Woltuch, in the *Sitzungsberichte* of the Vienna Academy of Sciences (vol. cxxii., p. 879), now bring forward good evidence to show that in two cases they have studied the sugar is *d*-xylose. In these cases the urine showed considerable reducing power, but no rotatory power. The osazone isolated had the same melting-point as ordinary *l*-xylosazone, but an opposite (positive) rotation; when the osazone was mixed with *l*-xylosazone the melting-point of the mixture rose 40°—a behaviour which is good evidence of its being *d*-xylosazone. The occurrence of *d*-xylose under such conditions is a striking example of abnormal metabolism, especially as the ordinary form of xylose which occurs in plant-materials is the lævo-form.

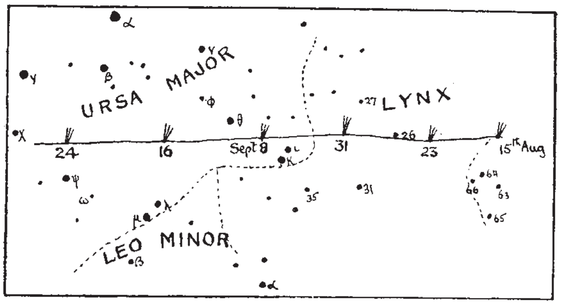
THE *Engineer* for August 7 contains an account of a fireless locomotive built by Messrs. Andrew Barclay, Sons and Co., Ltd., of Kilmarnock, and supplied to the Admiralty for service at one of the explosive depôts, where the question of absolute safety from fire is of the first importance. The locomotive has a reservoir partly filled with water, and is charged with high-pressure steam from a boiler placed outside the danger zone. It can work on one charge of the reservoir for several hours on continuous hauling, or for a much longer time on ordinary shunting work. It can stand for twelve hours in ordinary open-air temperature with small loss of steam, and can run back to the charging station under the very low pressure of 15 lb. per square inch. All the test conditions were more than fulfilled at the trials. The engine is not only fireless, but the rubbing surfaces, such as the brake blocks, and the impact points, such as the buffers, have been rendered sparkless by the use of special facings.

The lack of supplies of glass and porcelain from Germany and Austria, on account of the war, has affected various businesses depending upon them. We are informed, however, by the Thermal Syndicate, Ltd., manufacturers of pure fused silica, that it is still in a position to supply its "Vitreosil" ware promptly, as this substitute for porcelain and glass is made entirely in the works of the syndicate at Wallsend-on-Tyne.

"The Report of the Fourteenth Meeting of the Australasian Association for the Advancement of Science" has been recently issued by the Association from its permanent office in Sydney. It is edited by Dr. T. S. Hall, and contains a full account of the proceedings of the meeting held at Melbourne in 1913.

OUR ASTRONOMICAL COLUMN.

Comet 1913*f* (Delavan).—Little news is at hand concerning observations of Delavan's comet. During the present week the object will be situated in the constellation of the Lynx pursuing a course nearly midway between the stars 27 and 31 in that constellation, and at right angles to a line joining these two stars. The small chart below, given previously in this column on August 13, is reproduced here again for reference:—



Mr. W. B. Tripp, writing from Isleworth on August 22, says that he observed the comet on the night of August 21 with a binocular field-glass. He describes it as of "substantial proportions promising to be a fine object later."

The Large Canadian Reflector.—The Journal of the Royal Astronomical Society of Canada for May-June (vol. viii., No. 3) contains two illustrated articles dealing with the proposed site and the observing conditions for the large 72-in. reflector; these are contributed by Messrs. W. E. Harper and J. S. Plaskett. An examination of the seeing conditions of many scattered regions has resulted in the choice of a hill, Little Saanich, 732 ft. high, situated seven and a half miles from Victoria. While Mr. Harper admits that the transparency of the air at the Lick Observatory is superior to any place examined by him in Canada, he holds the opinion that in the matter of low temperature range and the character of the seeing itself conditions may be looked for to equal those upon Mount Hamilton. The Government of British Columbia has considered the whole project in a broad-minded way and agreed to provide 10,000 dollars for the purchase of the land and to build a road to the summit of the hill. Fifty acres of land have been secured. As regards the instrument itself, the disc for the mirror is ready for shipment, and it is stated that there is every prospect of the telescope being ready for erection next year. Messrs. Warner and Swasey are the constructors, and Mr. Plaskett says that he is in the highest degree delighted with their work, and firmly convinced that "this telescope in rigidity, suitability, and convenience will be away ahead of any hitherto built."

Rapid Convection in Stellar Atmospheres.—In this column for April 30 of this year (vol. xciii., p. 224) reference was made to the new interpretation to the observed displacements of the solar lines suggested by Mr. Evershed. The observations were explained by a very rapid descent of the cooler gases and vapours upon the body of the sun, most rapid in the higher levels, and less rapid as the successively lower levels were reached, combined with small effects due to pressures less than one atmosphere. Prof. W. W. Campbell points out (Lick Observatory Bulletin, No. 257) that these observations give us apparently a measure of the general convectional circulation in the sun's atmosphere, which, if confirmed, "must be considered as of very great importance." These considerations lead him to inquire into what may be occurring in the atmosphere of other suns. Assuming that surface temperatures of stars must be largely a function of their convection-activity, a sluggish star, *i.e.* one with little convection, should have a relatively cool surface, while a massive star, approximating to a perfect gas, should have a large convection and have relatively a hot surface. Having found that the radial velocities of Class B stars are observed about 4·5 km. a second too great (then attributed to pressure in the absorbing layers), Prof. Campbell, in the light of Evershed's results as regards the solar atmosphere, puts forward the view that this excess is probably due to the existence of relatively unobstructed radial circulation. This circulation would bring the internal heat to the surface, with little loss of time, to replenish loss by radiations to surrounding space. If the sun's atmosphere, which is sluggish, can account for a speed of 1 km. a second, a relatively hot star like those of Class B might rationally have a velocity of 4·5 km. a second.

A Novel Combination of Instruments.—Dr. Frank Schlesinger in the Publications of the Allegheny Observatory (vol. iii., No. 13), gives an account of the solar spectrograph of that observatory and the vertical telescope with which it is used. These instruments are the gift of the Hon. H. Kirke Porter, and they form part of the Keeler memorial telescope. The Keeler memorial telescope is a 30-in. reflector, and its mounting is used not only as a polar heliostat carrying an 18-in. mirror, but as a coelostat also with an 18-in. mirror. The telescope is mounted on a tall pillar circular at its upper end, and the dome is raised corre-